

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-41 (Cancelled)

42. (Currently Amended) A cartridge comprising:

a) a reaction chamber comprising:

i) a substrate comprising an array of electrodes, each comprising:

A) a self-assembled monolayer; and

B) a nucleic acid capture probe covalently attached to said

electrode;

ii) an inlet port ~~positioned at the bottom of the reaction chamber for~~  
~~the introduction of reagents;~~

iii) an outlet port ~~positioned at the top of the reaction chamber;~~  
wherein said inlet port and said outlet port are positioned to minimize the introduction or  
retention of air bubbles upon introduction of reagents; and

b) interconnects to allow the electrical connection of said electrodes to a processor.

43. (Previously Presented) A cartridge according to claim 42, wherein the inlet port and the outlet port are separated.

44. (Previously Presented) A cartridge according to claim 42, wherein the inlet port connects to the outlet port.

45. (Currently amended) A cartridge comprising:

a) a reaction chamber comprising:

i) a substrate comprising a printed circuit board comprising an array of electrodes,

each electrode comprising:

- A) a self-assembled monolayer; and
- B) a nucleic acid capture probe covalently attached to said electrode;
- ii) an inlet port positioned to minimize the introduction or retention of air bubbles upon ~~for~~ the introduction of reagents; and
- b) interconnects to allow the electrical connection of said electrodes to a processor.

46. (Previously Presented) A cartridge according to claim 45, wherein at least one of the electrodes is on a surface of the printed circuit board.

47. (Previously Presented) A cartridge according to claim 45, wherein at least one of the electrodes is fabricated on the printed circuit board.

48. (Previously Presented) A cartridge according to claim 42 or 45, wherein said inlet port comprises a semipermeable membrane filter.

49. (Currently Amended) A cartridge comprising:

- a) a reaction chamber comprising:
  - i) a substrate comprising an array of electrodes, each electrode comprising:
    - A) a self-assembled monolayer; and
    - B) a nucleic acid capture probe covalently attached to said electrode;
  - ii) an inlet port positioned to minimize the introduction or retention of air bubbles upon ~~for~~ the introduction of reagents, said inlet port comprising a semipermeable membrane filter; and
- b) interconnects to allow the electrical connection of said electrodes to a processor.

50. (Previously Presented) A cartridge according to claim 49, wherein said semipermeable membrane comprises polytetrafluoroethylene.

51. (Previously Presented) A cartridge according to claim 49, wherein said semipermeable membrane comprises expanded-polytetrafluoroethylene.

52. (Previously Presented) A cartridge according to claim 42 or 49 wherein said substrate comprises a printed circuit board.

53. (Cancelled)

54. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein said reaction chamber further comprises a gasket to retain fluid in contact with said array.

55. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein said reaction chamber further comprises an outlet port.

56. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein said array is on one surface of said substrate.

57. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein two surfaces of said substrate each comprise an array.

58. (Previously Presented) A cartridge according to claim 42, 45 or 49, further comprising a cap comprising at least one storage well comprising assay reagents.

59. (Previously Presented) A cartridge according to claim 58, wherein the cap is removable.

60. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein said capture binding ligands comprise proteins.

61. (Previously Presented) A cartridge according to claim 42, 45 or 49, further comprising an assay complex on at least one of said electrodes, said assay complex comprising at least one of said capture binding ligands, a target analyte, and an electron transfer moiety.

62. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein the self-assembled monolayer comprises a conductive oligomer.

63. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein at least one of the electrodes comprises gold.

64. (Previously Presented) A cartridge according to claim 42, 45 or 49, wherein the self-assembled monolayer comprises a thiol-containing monolayer forming species.

65. (Withdrawn – Currently amended) A method for filling a reaction chamber comprising:

providing a cartridge comprising

a) a reaction chamber comprising

i) a substrate comprising an array of electrodes, each comprising:

A) a self-assembled monolayer; and

B) a nucleic acid capture probe covalently attached to said electrode;

ii) an inlet port ~~positioned at the bottom of the reaction chamber for the introduction of reagents~~, and

iii) an outlet port ~~positioned at the top of the reaction chamber~~;

wherein said inlet port and said outlet port are positioned to minimize the introduction or retention of air bubbles upon introduction of reagents; and

b) interconnects to allow the electrical connection of said electrodes to a processor;

introducing a fluid into the inlet port positioned at the bottom of the reaction chamber;

allowing escape of gas through the outlet port at the top of the reaction chamber, thereby filling the reaction chamber without introducing a bubble into the reaction chamber.

66. (Previously presented) The cartridge according to claim 42, 45 or 49 wherein said covalent attachment is via a linker selected from the group consisting of a conductive oligomer and an insulator.